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# Associations between moral injury and ICD-11 post-traumatic stress disorder (PTSD) and complex PTSD among help-seeking nurses: a cross-sectional study

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## ABSTRACT

**Objectives** This study aimed to evaluate how moral injury (MI), traumatic experiences and daily stressors were related to the symptoms of post-traumatic stress disorder (PTSD) and International Classification of Diseases 11th revision specific complex PTSD (CPTSD) symptoms of disturbances in self-organisation (DSO) in a treatment-seeking sample of nurses.

**Design** A cross-sectional study.

**Setting** Nurses from all regions of Lithuania participated in the study. The data were collected between April and May 2021.

**Participants** A total of 206 nurses, mean age 42.34 years (SD=11.68), 97.1% women and with 65% >10 years of work experience.

**Results** The prevalence of PTSD and CPTSD in the treatment-seeking sample of nurses was 9.2% and 10.2%, respectively. The results of structural equation modelling indicated an acceptable model fit for the model regarding the links between trauma exposure, daily stressors, MI, PTSD and DSO symptoms, ($\chi 2$ (df)=219.718 (123), p<0.001, Comparative Fit Index/Tucker-Lewis Index=0.937/0.922, root mean square error of approximation (90% CI)=0.062 (0.048 to 0.075), standardised root mean square residual=0.049). MI had a large effect on DSO symptoms, β=0.667, p<0.001, and a medium effect on PTSD symptoms, β=0.394, p<0.001. Daily stress but not trauma exposure was significantly related to MI, β=0.618, p<0.001.

**Conclusions** The prevalence of PTSD and CPTSD in a treatment-seeking sample of nurses inform healthcare administrators, policymakers and medical staff about the demand for psychosocial interventions for healthcare workers focused on stress management to address their daily stressors and mitigate effects on MI or trauma-focused treatments for PTSD/CPTSD.

**Trial registration number** NCT04817995; Pre-results.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Post-traumatic stress disorder (PTSD and complex PTSD) in healthcare workers (HCWs) was evaluated based on International Classification of Diseases 11th revision (ICD-11) diagnostic criteria.
⇒ A novel measure the Moral Injury Outcome Scale for assessing of moral injury was used in HCW's sample.
⇒ Structural equational modelling was applied for exploration of links between moral injury and ICD-11 trauma-related disorders.
⇒ Self-referred help-seeking sample limit generalisation of study findings to all HCWs.
⇒ Cross-sectional design has limitations in exploring associations between moral injury and PTSD, and complex PTSD in our study.

## INTRODUCTION

Healthcare workers (HCWs) are at high risk of being exposed to potentially morally injurious events (PMIEs) in their clinical practice.[1–3] Furthermore, PMIEs are likely to be more common in the context of the coronavirus (COVID-19) pandemic due to the increased pressure to provide sufficient care for patients.[2 4] Moral injury (MI) may appear because of the violation of one's moral code as a consequence of a particular action or absence of them.[5] MI is not a mental disorder, but is associated with mental health conditions such as depression, post-traumatic stress disorder (PTSD) and suicidal ideation.[6] Despite the evidence regarding links between MI and mental health in war veterans,[5 7] there is a gap in the current knowledge in terms of the relationships between MI, PTSD and complex PTSD (CPTSD) in HCWs.

Recent studies indicated that the prevalence of PTSD among HCWs varied from 13.2% to 31%.[8] However, little is known about the prevalence of CPTSD in samples of HCWs since CPTSD is a newly proposed diagnosis in the 11th revision to the WHO's International Classification of Diseases (ICD-11).[9] In addition to PTSD symptoms, CPTSD also captures disturbances in self-organisation (DSO) symptoms such as affective dysregulation, negative self-concept and disturbances in relationships.[10] There is initial evidence regarding the links between MI,

PTSD and CPTSD, which showed that MI is more likely to be related to CPTSD rather than to PTSD.[11]

Not all morally injurious experiences lead to MI. The current literature suggests that the risk of MI in HCWs is higher if an individual: (a) is exposed to the inaction of the leader regarding the situation that leader is responsible for, (b) is not sufficiently prepared to deal with the psychological and moral distress for the decision made and (c) is exposed to other traumatic events simultaneously.[2] Furthermore, HCWs who have previous traumatic experiences and are exposed to intense daily stress are more vulnerable to MI. In particular, qualitative studies have demonstrated that job-related stressors are among the factors to increase the moral distress among nurses.[12] Moreover, previous studies have reported positive links between moral distress and secondary traumatic stress as well as burnout.[13]

The current study focused on the role of MI on PTSD and CPTSD in nurses during the COVID-19 pandemic. First, we hypothesised that MI would be more related to symptoms of CPTSD, that is, DSO symptoms, rather than symptoms of PTSD. Second, we expected that exposure to previous traumatic experiences, as well as daily stress, will be statistically significant predictors for MI in HCWs.

## METHODS

### Study design and setting

This cross-sectional study was conducted as part of a larger project focused on medical staff stress recovery psychosocial intervention.[14] Licensed nurses from all regions of Lithuania were invited to register for the aforementioned psychosocial intervention and to complete online questionnaire via a secure web application.[15] They were informed about the confidentially of the personal data and provided informed consent. Each participant was blinded by assigning an anonymous identifying number. Only researchers directly involved in the study had access to the data. The trial was registered on 30 March 2021 ( ClinicalTrials.gov). The data for the current study were collected between April and May 2021. The sample size was determined by conducting a power analysis which indicated that a model with three predictors would require at least 187 participants in order to obtain the effect sizes as small as 0.10 with alpha error probability of 0.05 and the statistical power of 0.95.

### Eligibility criteria

The invitation for licensed nurses to participate in the study was distributed through healthcare institutions, professional networks and social media. Written informed consent online was obtained before participating in the study. The eligible criteria for inclusion in the study were as follows: to be a licensed nurse; to be at least 18 years old; to comprehend Lithuanian to the degree that one understands the content and instructions of the study; to have access to a computer, tablet, smartphone or a similar device with an internet connection.

### Patient and public involvement

No patient involved.

### Measures

#### PTSD and CPTSD

The International Trauma Questionnaire (ITQ)[10 16] was used to measure self-reported symptoms of ICD-11 PTSD and CPTSD. PTSD is evaluated by six items capturing the symptoms of re-experiencing (two items), avoidance (two items) and sense of threat (two items). For CPTSD, three additional symptoms of DSO are assessed by six items measuring: affective dysregulation (two items), negative self-concept (two items) and disturbances in relationships (two items). Additionally, six functional impairment items associated with PTSD (three items) and DSO (three items) symptoms in social, professional or other significant areas are included in the ITQ. All 18 ITQ items are evaluated on a 5-point Likert scale ranked from 0 (=Not at all) to 4 (=Extremely). Participants were asked to include index trauma for the assessment of PTSD and CPTSD symptoms before responding to the ITQ items.

Based on the ITQ diagnostic algorithm, the diagnosis for PTSD is met if at least one of two symptoms from the re-experiencing, avoidance and sense of threat subscales is ≥2. For a diagnosis of CPTSD, the PTSD criteria have to be met, and subscales of DSO symptoms have to be ≥2 for each of the items of the subscales. Additionally, functional impairment is a necessary criterion for both PTSD and CPTSD. In our study PTSD and DSO had good internal scale reliability, Cronbach α were 0.88 and 0.83, respectively.

#### Moral injury

The Moral Injury Outcome Scale (MIOS)[17] was used to measure self-reported MI. The MIOS comprises 14 items. All items of the MIOS are ranked on a 5-point Likert scale ranging from 0 (=Strongly disagree) to 4 (=Strongly agree). A higher score indicates more pronounced MI. Participants were asked to indicate PMIE in the MIOS. However, they were offered an option not to disclose PMIE if they had concerns about safety and privacy. A confirmatory factors analysis with eight residual covariances as suggested by model fit indices, indicated a good model fit for a single factor, ($\chi 2$ (69)=143.844, p<0.001, Comparative Fit Index (CFI)/Tucker-Lewis Index (TLI)=0.941/0.922, root mean square error of approximation (RMSEA) (90% CI)=0.073 (0.056 to 0.089), standardised root mean square residual (SRMR)=0.047). In the current study, MIOS had good internal scale reliability (Cronbach α = 0.90).

#### Traumatic events

Trauma exposure was evaluated by using the list of potentially traumatic events developed by the authors of the study. The list comprised traumatic events such as accident, physical abuse, sexual abuse, a threat to life and sudden and unexpected death. All items had a binary response option, 0 (=No) and 1 (=Yes). The sum of experienced traumatic events was used for the statistical

analysis. A higher score indicates a higher number of traumatic events.

### Daily stress

The Brief Daily Stressor Screening (BDSS) suggested by Scholten and colleagues (2014) was used to evaluate daily stressors over the last 12 months. BDSS covers nine areas of stressful experience such as family responsibilities, health problems, financial restrictions, dissatisfaction with the studies or work, housing situation, conflicts with others, etc. The items are rated on a 5-point Likert scale from 0 (=Not at all) to 4 (=Very much). A higher score indicates a higher number of daily stressors. We used a total score of daily stressors. In our study, BDSS had good internal scale reliability (Cronbach α=0.80).

### Statistical analyses

To describe the sample, we calculated descriptive statistics of demographic and mental health variables for the nurses who met the criteria for PTSD, CPTSD and the nurses with no PTSD or CPTSD. To compare the groups with PTSD and CPTSD in terms of mental health rates, we used t-tests. IBM SPSS V.25.0 was used in order to conduct the aforementioned calculations. Finally, we conducted a structural equation modelling (SEM) analysis using Mplus V.8.2[18] with the observed predictor variables of trauma exposure and daily stress, the latent mediator variable MIOS (with eight residual correlations as suggested by confirmatory factor analysis (CFA)) and the observed outcome variables of PTSD symptoms and DSO symptoms among nurses. We included PTSD and DSO symptom intensity in SEM model computed by summing responses to PTSD (six items) and DSO (six items) symptom items, respectively. As the measured variables represent temporal ordering (trauma exposure is measured in a lifetime perspective, daily stress—in 1-year perspective, when symptoms of moral injury and PTSD/CPTSD are measured in a perspective of 1 month), we tested both direct and indirect (or mediated) links between study variables. The indirect effects were calculated by using a bootstrap estimation approach with 5000 samples.[19] For trauma exposure, we calculated the sum of traumatic events experienced during a lifetime. All participants were included in the analysis despite their exposure to traumatic and morally injuring experiences to increase the variance and statistical power. To evaluate model fit we used the TLI and the CFI, with values higher than 0.90 indicating an acceptable fit; the RMSEA, with values below 0.08 indicating acceptable fit; the SRMR, with values below 0.08 indicating acceptable fit.[20] No data imputation was applied.

## RESULTS

### Sample characteristics

A total of 206 nurses participated in the study. Their mean age was 42.34 years (SD=11.68), and 97.1% were women. A majority of this treatment-seeking sample (58.7%, 121 participant) had a higher college education, 39.3% (81 participants) had a university education and 1.9% (4 participants) had secondary or lower education. Nurses varied in medical specialties such as surgical (10.2%), therapy (49.0%), anaesthesiology (16.0%), outpatient (13.6%) and other medical specialties (11.1%). Detailed demographic sample characteristics as well as participants' mental health indicators are displayed in table 1.

**Table 1** Sample demographic characteristics and mental health indicators

| | Total sample | No diagnosis | PTSD group | CPTSD group |
|---|---|---|---|---|
| | N=206 | n=166 | n=21 | n=19 |
| Age, M (SD) | 42.34 (11.68) | 42.15 (11.59) | 44.86 (13.04) | 41.21 (11.15) |
| Gender, n (%) | | | | |
| Male | 6 (2.9) | 5 (3.0) | 1 (4.8) | 0 (0.0) |
| Female | 200 (97.1) | 161 (97.0) | 20 (95.2) | 19 (100.0) |
| Relationship status, n (%) | | | | |
| In a long-term relationship | 150 (72.8) | 121 (72.9) | 15 (71.4) | 14 (73.7) |
| Not in a long-term relationship | 56 (27.2) | 45 (27.1) | 6 (28.6) | 5 (26.3) |
| Work experience, n (%) | | | | |
| <10 years | 73 (35.4) | 57 (34.3) | 7 (33.3) | 9 (47.4) |
| >10 years | 133 (64.6 | 109 (65.7) | 14 (66.7) | 10 (52.6) |
| PTSD symptoms, M (SD) | 6.83 (5.91) | 4.76 (4.36) | 14.71 (2.72) | 16.16 (3.42) |
| DSO symptoms, M (SD) | 8.42 (5.12) | 7.58 (4.88) | 8.67 (3.04) | 15.42 (3.47) |
| Moral injury, M (SD) | 18.43 (10.28) | 16.97 (10.29) | 22.19 (8.13) | 27.00 (6.93) |
| Traumatic events, M (SD) | 1.13 (1.17) | 1.02 (1.13) | 1.67 (1.16) | 1.47 (1.39) |
| Daily stressors, M (SD) | 14.84 (7.31) | 13.70 (7.31) | 19.05 (5.0) | 20.16 (5.47) |

CPTSD, complex PTSD; DSO, disturbances in self-organisation; PTSD, post-traumatic stress disorder.

### Potentially morally injurious events

A substantial proportion of nurses (61.2%) across the treatment-seeking sample had been exposed to at least one PMIE in their work. Specifically, 29.1% of the nurses reported that they themselves had acted or failed to do act which was against their moral code or values. An additional 39.3% of the nurses had seen someone else acting or failing to act which was against the moral codes of the observer. Almost half of the participants (49.0%) had directly been affected by someone acting or failing to act that went against their moral code or values. Participants who were willing to specify experienced PMIEs described the content of the aforementioned events as follows: medical staff emotional abuse performed by senior colleagues, patient physical abuse, witnessing intentional harm conducted by senior colleagues to the patients or colleagues, conflicts with colleagues or patients, unintentional mistake and unfair behaviour regarding working conditions. In addition, three nurses replied unable to reveal the content of PMIE.

### Trauma exposure, PTSD and CPTSD

Nurses reported exposure to various traumatic events in their lifetime, such as car accident (21.8%), physical abuse (25.2%), sexual abuse (9.7%), a threat to life (14.1%) and sudden unexpected death (41.7%). Index traumatic events for the PTSD/CPTSD symptoms were related to health issues, loss of loved one, patient's death, sexual, physical and emotional abuse, domestic violence, mobbing, work accidents and personal life events.

The prevalence of PTSD and CPTSD based on self-report was 9.2% (19 participants) and 10.2% (21 participants), respectively. The descriptive statistics are presented in table 1 including demographic and mental health variables for the four groups (total sample, PTSD, CPTSD or no PTSD or CPTSD).

Both PTSD and CPTSD groups did not differ regarding PTSD symptoms such as re-experiencing, $t(38) = -0.065$, p=0.957, avoidance, $t(26\ 511) = -1.081$, p=0.290 and sense of threat, $t(38) = -1.875$, p=0.069. Furthermore, PTSD and CPTSD groups differed in terms of DSO symptoms such as negative self-concept, $t(38) = -5.439$, p<0.001, disturbances in relationship, $t(38) = -4.650$, p<0.001, but not in terms of affective dysregulation, $t(38) = -1.692$, p=0.099. In addition, both groups did not differ regarding trauma exposure, $t(38) = 0.860$, p=0.395, and daily stress, $t(38) = -0.671$, p=0.506. MI was more common in nurses diagnosed with CPTSD compared with nurses with PTSD, however, the difference regarding MI scores in two groups did not reach statistical significance, $t(38) = -2.013$, p=0.051.

### The links between trauma, daily stress, MI and symptoms of PTSD, and DSO

We tested the role of trauma exposure, daily stressors and MI for PTSD symptoms and CPTSD, that is, DSO symptoms (figure 1), using a SEM approach. The SEM model fit was found to be acceptable, ($\chi 2$ (df) =219.718 (123), p<0.001, CFI/TLI=0.937/0.922, RMSEA (90% CI)=0.062 (0.048 to 0.075) and SRMR=0.049). Daily stress but not trauma exposure was significantly directly related to MI, β=0.618, p<0.001. MI had a large direct effect on DSO symptoms, β=0.663, p<0.001, and a medium direct effect on PTSD symptoms, β=0.387, p<0.001. Additionally, daily stress was indirectly, that is, though MI, related both to PTSD ((95% CI)=0.239 (0.152 to 0.327)) and DSO ((95% CI)=0.410 (0.315 to 0.502)) symptoms.

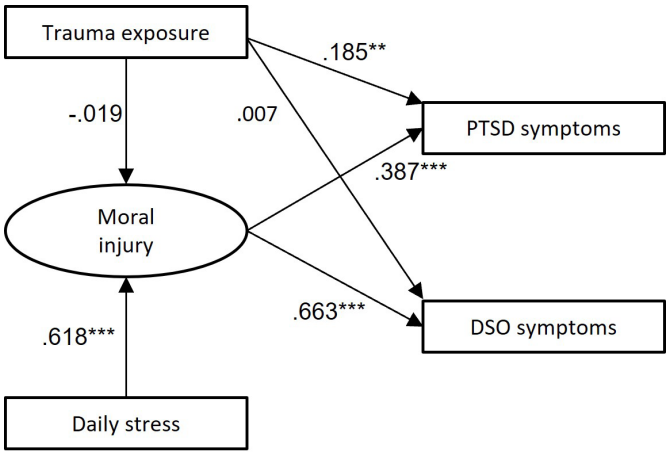


**Figure 1** The model of factors for PTSD symptoms and DSO symptoms among nurses, ***p<0.001, **p<0.01. DSO, disturbances in self-organisation, PTSD, post-traumatic stress disorder.

## DISCUSSION

The aim of this study was to evaluate the role of MI for PTSD and CPTSD among nurses during the COVID-19 pandemic. We found a high prevalence of PTSD and CPTSD, with around 20% of nurses reporting trauma-related disorders. Furthermore, almost two-thirds of the sample had been exposed to potentially morally injurious experiences indicating that HCWs regularly are exposed to an experience potentially leading to MI. Moreover, we found that MI was associated with a higher daily stress burden and MI mediated DSO symptoms of the CPTSD.

The findings are in line with other studies in which a high prevalence of PTSD in medical staff samples has been reported.[8 21 22] The medical profession is often associated with a confrontation with the death, and these experiences can lead to PTSD, especially during the COVID-19 pandemic.[2 23] To our knowledge our study is among the first to estimate incidents of CPTSD among HCWs. We found lower rates of PTSD in comparison to some other studies, which may be because we were able to distinguish between PTSD and CPTSD, as the total PTSD/CPTSD rate was comparable to other studies. However, our findings should be interpreted in the context of the treatment-seeking sample, as our study participants were recruited for participation in psychosocial stress recovery intervention[14] and potentially had higher rates of PTSD/CPTSD.

A previous study in a military sample indicated that there is an association between MI and CPTSD, in particular, MI and DSO symptoms.[11] The findings of our study are in line with the previous research as MI was associated with PTSD and DSO symptoms. But the association between DSO and MI was stronger in our research. While MI is not a mental disorder[2] we could speculate that healthcare staff exposed to PMIEs and situations which can be traumatising, such as a death of a patient, have higher risk for developing CPTSD symptoms, in particular DSO symptoms, which include negative self-concept, affect dysregulation and difficulties in relationships.

Trauma exposure was associated with PTSD symptoms but not with DSO symptoms. It is possible that our screening for trauma exposure could not capture complicated traumatic experiences, such as prolonged or repeated traumatisation, which could be more associated with CPTSD DSO symptoms. However, our findings highlight the importance of daily stressors in understanding MI and traumatic stress. The daily burden of stress at the workplace or in personal life can reduce coping and resources needed to deal with difficult life situations and thus lead to vulnerability to MI.

The study has several limitations that need to be taken into account. The sample size in the study was moderate and even small when it comes to the subgroups of PTSD and CPTSD. The study was conducted during the COVID-19 pandemic, and it could be difficult for HCWs to participate in the study due to the high workload. Moreover, there is evidence that HCWs have had more mental health issues during the COVID-19 pandemic or are at higher risk for MI, and that could have had an impact on study findings. Furthermore, the sample was not representative of all the HCWs specialists and professions, and future studies are needed to replicate findings in other countries and larger samples. We used self-report measures for trauma-related disorders and MI, and while we aimed to ensure confidentiality of study participants, disclosure of morally challenging situations and traumatic experiences in research context might be difficult for participants and could influence study findings. Furthermore, we used a novel MIOS measure for measuring MI in our study. While we found psychometric of the MIOS acceptable in the study, eight correlations between residual errors of the single latent factor MIOS structure indicate the need for future studies of evaluation of the MIOS validity and structure in other samples. Moreover, the mediation effects should be interpreted with caution due to the cross-sectional study design and need to be replicated with longitudinal data.

Overall, we hope that the study findings provide more insights into the mental health of HCWs. The results may inform healthcare administrators, policymakers and staff about the importance of well-being programmes for staff, stress-management programmes addressed to help staff to deal with daily stressors to provide more coping skills with a burden associated with professional stressors at work or at home. Innovative solutions, such as internet-based interventions,[14 24] which could be provided in a flexible self-administered way, could help staff to gain and develop stress management and recovery skill. However, structural reform at the organisations and algorithms that help staff in dealing with morally challenging situations is also important. Considering that around 20% of staff might have PTSD or CPTSD, offering trauma-focused treatments for those in need is crucial.

## Practical implications

Nursing is considered an exceptionally stressful and demanding job among the health professions. Although it can be hard to influence the exposure to traumatic events or PMIEs in HCWs, our results indicate that the reduction of exposure to daily stressful experiences and the levels of overall stress may be critical in providing support for nurses. The institutional support and the provision of work-related resources may be among the most effective strategies in the long term. However, due to the excessive levels of stress, the immediate approach would require emotional support by delivering stress management interventions (including the internet-delivered interventions) are needed to contribute to the mental health of HCWs and, consequently, the well-being of patients being taken care of.

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**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** The study was approved on 22 March 2021 by the Psychological Research Ethics Committee in Lithuania (document number 2021-03-22/61). All participants were asked to provide a written informed consent online in order to participate in the study. Participants gave informed consent to participate in the study before taking part.

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**Data availability statement** Data are available upon reasonable request. The data file is not publicly available. An anonymous copy of the data file of this study is available from the corresponding author upon reasonable request.

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